WD Hard Drive

Interface Guide

WD® Service and Support

Should you encounter any problem, please give us an opportunity to address it before returning this product. Most technical support questions can be answered through our knowledge base or e-mail support service at *http://support.wdc.com*. If the answer is not available or, if you prefer, please contact WD at the best telephone number shown below.

Your product includes 30 days of free telephone support during the warranty period. This 30-day period starts on the date of your first telephone contact with WD technical support. E-mail support is free for the entire warranty period and our extensive knowledge base is available 24/7. To help us keep you informed of new features and services, remember to register your product online at *http://register.wdc.com*.

Accessing Online Support

Visit our product support website at *http://support.wdc.com* and choose from these topics:

- **Downloads** - Download drivers, software, and updates for your WD product.
- **Registration** - Register your WD product to get the latest updates and special offers.
- **Warranty & RMA Services** - Get Warranty, Product Replacement (RMA), RMA Status, and Data Recovery Information.
- **Knowledge Base** - Search by keyword, phrase, or answer ID.
- **Installation** - Get online installation help for your WD product or software.
- **WD Community** – Share your thoughts and connect with other WD users.

Contacting WD Technical Support

When contacting WD for support, have your WD product serial number, system hardware, and system software versions available.

North America		**Europe (toll free)***	00800 ASK4 WDEU (00800 27549338)
English	800.ASK.4WDC (800.275.4932)		
Spanish	800.832.4778	**Europe**	+31 880062100
		Middle East	+31 880062100
Mexico	001 8002754932	**Africa**	+31 880062100
South America		**Asia Pacific**	
Chile	1230 020 5871	Australia	1 800 42 9861
Venezuela	0800 100 2855	China	800 820 6682/+65 62430496
Peru	0800-54003	Hong Kong	+800 6008 6008
Uruguay	000 413 598 3787	India	1 800 200 5789
Argentina	0800 4440839	Indonesia	+803 852 9439
Brazil	0800 7704932	Japan	0120 994 120 / 00531 65 0442
		Korea	02 703 6550
		Malaysia	+800 6008 6008/1 800 88 1908/ +65 62430496
		Philippines	1 800 1441 0159
		Singapore	+800 6008 6008/+800 608 6008/ +65 62430496
		Taiwan	+800 6008 6008/+65 62430496

** Toll free number available in the following countries: Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom.*

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Choosing the Right Drive Type

Not sure which drive interface is right for your computer? This guide helps you determine the right type of drive interface by asking three questions:

1. Which internal drive interface is the right choice:
   - Serial Advanced Technology Attachment (SATA)?
   - Parallel Advanced Technology Attachment (PATA)?
2. Which internal drive interface is compatible with my operating system:
   - SATA?
   - PATA?
3. Which external drive interface is the right choice:
   - Universal Serial Bus (USB)?
   - FireWire®?
   - External Serial Advanced Technology Attachment (eSATA)?
   - Gigabit Ethernet?
   - Thunderbolt™?

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Internal Drive Interface Choices

Which internal drive is the right choice: SATA or PATA?

Look at the cable connections on your computer's motherboard to determine the internal hard drive interface you need:



SATA PATA

SATA Hard Drives

Because of their considerably narrower cables, SATA hard drives provide increased airflow and less clutter in the computer enclosure compared to PATA drives.

For computer system motherboards that do not have SATA ports, a PCI SATA controller card can be installed to add support for SATA drives.

If you do not know whether your computer has SATA ports on the motherboard, refer to your computer or motherboard documentation or contact the motherboard manufacturer.

Drives in this category include:
Serial ATA International Organization: Serial ATA Revision 1.0
Serial ATA International Organization: Serial ATA Revision 2.0
Serial ATA International Organization: Serial ATA Revision 3.0

PATA Hard Drives

PATA hard drives were an earlier standard in the computer industry for more than 10 years.

For computer system motherboards that do not have PATA ports, a PCI PATA controller card can be installed to add support for PATA drives.

If you do not know whether your computer has PATA ports on the motherboard, refer to your computer or motherboard documentation or contact the motherboard manufacturer.

WD Internal Hard Drive Features

Feature	SATA 1.5Gb/s Hard Drives	SATA 3Gb/s Hard Drives	SATA 6Gb/s Hard Drives	PATA 100MB/s Hard Drives
Maximum data transfer rate	1.5 Gb/s	3 Gb/s	6 Gb/s	100 MB/s
Supported devices per cable	One	One	One	Two
Jumper block	8-pin (no Master/ Slave settings)	8-pin (no Master/ Slave settings)	8-pin (no Master/ Slave settings)	10-pin (single, Master, Slave, and cable select (CSEL) settings)

Which internal drive is compatible with my operating system: SATA or PATA?

Your operating system, as well as your computer hardware, must support the hard drive you choose:

Your Computer's Operating System	WD Hard Drive Compatibility		
	SATA 3Gb/s	SATA 6Gb/s	PATA
Windows 7	Yes	Yes	Yes
Windows Vista®	Yes	Yes	Yes
Windows XP	Yes	Yes	Yes
Windows 2000	Yes	No	Yes
Mac® OS X	Yes	Yes	Yes

Note: Compatibility may vary depending on your computer's hardware configuration and operating system.

Other helpful information is available in the WD Knowledge Base at *support.wdc.com*:

- What issues should I be concerned about when using a drive larger than 137 GB? (Answer ID 533)
- Are PATA hard drives larger than 137 GB supported in Mac systems? (Answer ID 927)

3 External Drive Interface Choices

Which external drive interface is the right choice: USB, FireWire®, eSATA, Gigabit Ethernet, Thunderbolt™?

Each interface has its strengths, which are explained in the following sections. The right choice depends on compatibility with your computer and how you want to use your device. Look at the external connections on your computer to determine the external hard drive interface you need.

USB

USB is the industry-standard peripheral connection for most Windows-based computers. This interface uses a tiered star interconnect technology to attach multiple external devices to a central host controller.

The interface provides a simplified external alternative to many varieties of parallel and serial ports.

USB connector types include Standard-, Mini-, and Micro-USB configurations to accommodate most popular computer peripheral, audio/visual, and mobile communications devices. When required, adapter cables can accommodate different connector types.

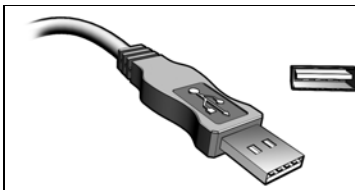
The USB interface has three available configurations:

- USB 1.0/1.1
- USB 2.0
- USB 3.0

If you do not know the configuration of your computer's USB ports, refer to your computer documentation or contact the manufacturer.

USB 1.0/1.1. This is the first version of USB created and features a maximum data rate of 12 Mb/s. If your USB port is this version, you can use a USB 2.0 hard drive, but transfer rates default to the slower version.

USB 2.0. USB 2.0 transfers data at a maximum rate of 480 Mb/s. Sustained data transfer rates, usually from 10 to 30 MB/s, vary depending on many factors including the type of device, data being transferred, and computer system speed. If your USB port is an earlier version, USB 1.0 or 1.1, you can use a USB 2.0 hard drive, but transfer rates default to the slower version.



Standard USB 2.0 or 3.0



Mini USB



Micro USB

USB 3.0. USB 3.0 transfers data at a maximum rate of 4.80 Gb/s. Sustained data transfer rates, usually from 100 to 300 MB/s, vary depending on many factors, including the type of device, data being transferred, and computer system speed.



Micro USB 3.0

If your USB port is an earlier version, USB 1.0 or 2.0, you can use a USB 3.0 hard drive, but transfer rates default to the slower version. USB 3.0 connectors, on the computer side, are color-coded blue.

FireWire

FireWire, also called IEEE 1394, is a high-performance connection standard for personal computers and consumer electronics. This interface uses a daisy-chained interconnect architecture to allow multiple storage devices to share a single host system FireWire port.

The peer-to-peer interface allows devices to communicate and transfer data with greatly reduced host system overhead and higher efficiency compared to alternative interfaces like USB.

The FireWire interface has two configurations:

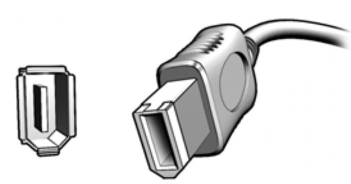
- FireWire 400
- FireWire 800

Cables and adapters are available to connect FireWire 800 or 400 host ports to FireWire 800 or 400 connectors.

FireWire 400. Also called IEEE 1394a, FireWire 400 transfers large amounts of data between computers and peripheral devices at rates up to 400 Mb/s. It is the most common FireWire interface, present in 6-pin (desktops) and 4-pin (laptops and camcorders, etc.) variants.



FireWire 400 (IEEE 1394a) 4-pin



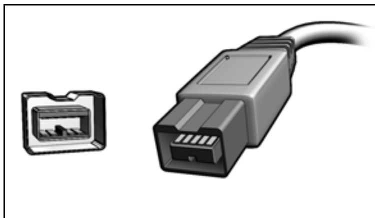
FireWire 400 (IEEE 1394a) 6-pin

Cables and adapters are available to connect mini or standard host FireWire 400 ports to 4-pin or 6-pin connectors. The host provides power through the 6-pin interface to connected devices, where required.

Most desktop external storage units are self-powered (wall power supply) and do not require power from the host interface.

Firewire 400 is commonly used to connect digital cameras, camcorders and popular external storage devices, and has the bandwidth to perform common DV-resolution video editing, in most cases.

FireWire 800. Also called IEEE 1394b, FireWire 800 provides the high-speed connection and bandwidth required for multiple-stream, uncompressed digital video and noise-free, high-resolution digital audio.

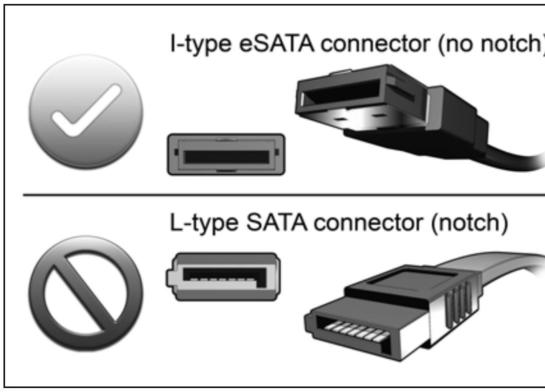


FireWire 800 (IEEE 1394b) 9-pin

FireWire 800 is typically twice as fast as FireWire 400 and is necessary for HD video editing and other applications where the fastest data transfers and expandability by daisy chaining are needed.

eSATA

SATA is very effective for external storage applications, and the external SATA (eSATA) interface (detailed in the SATA 2.5 specification) provides a physically secure and fast connection for external hard drives.



With up to 6 Gb/s data transfers, this interface provides a high data transfer rate suitable for hard drives, home networking, digital video, and home entertainment devices such as set-top boxes and personal video recorders.

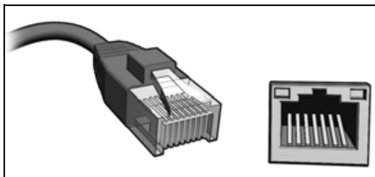
Some systems can be configured to boot from an external eSATA drive.

eSATA and internal SATA cables and connectors cannot be used interchangeably. This is important since eSATA cables and connectors are designed for 5000 insertion and removal cycles while internal SATA cables and connectors are designed for only 50 insertion and removal cycles.

Note: SATA cables with an L-type connector are *not* compatible with WD eSATA devices.

Gigabit Ethernet

Ethernet is a standard method of connecting computers to a local area network (LAN) using twinlead cable. As an external hard drive interface, it is most often used for network-attached storage (NAS) applications in which files can be shared across a network or accessed remotely.



Ethernet

Gigabit Ethernet, with its data transfer rate of 1000 Mb/s, is the latest and fastest Ethernet standard that evolved from the earlier Fast Ethernet (100 Mb/s) and Ethernet (10 Mb/s) standards.

Benefits of Gigabit Ethernet include increased bandwidth, quality of service (QoS) features that promote smooth transmission of audio and video, and compatibility with existing Ethernet and Fast Ethernet networks.

Thunderbolt™

Thunderbolt technology delivers unprecedented data transfer rates thanks to its revolutionary bidirectional I/O throughput. Each Thunderbolt port provides two bidirectional channels, each with theoretically up to 10 Gb/s of bandwidth.



Thunderbolt

Thunderbolt technology supports daisy chaining multiple devices through a single Thunderbolt connector so you can multitask at Thunderbolt technology speed without having to use a switch or hub. This reduces the hardware clutter and increases productivity.

You can connect additional Thunderbolt technology-enabled external hard drives, media players, HD displays, media capture and editing systems and more through a single connector.

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Summary

Interface	Description	Transfer Rate	Best For	Most Popular Environment
USB 1.0/1.1	Hot-swappable*	12 Mb/s maximum burst transfer rate	Connecting to different systems quickly and easily	PCs
USB 2.0	Hot-swappable*	480 Mb/s maximum burst transfer rate	Connecting to different systems quickly and easily	PCs
USB 3.0	Hot-swappable* full-duplex asynchronous protocol	4.8 Gb/s maximum burst transfer rate	High-def. video cameras, mobile media players and phones, and terabyte storage devices	PCs
FireWire 400	Hot-swappable*	400 Mb/s maximum sustained transfer rate	Fast transfer of large amounts of data frequently or for audio/video applications like home video editing	Macintosh® computers
FireWire 800	Hot-swappable*	800 Mb/s maximum sustained transfer rate	Multiple-stream digital video and high-resolution digital audio and video applications	Macintosh® computers
eSATA	Fast and physically secure connection for external hard drives	Up to 6 Gb/s maximum sustained transfer rate—nearly equivalent to internal drive performance	Transferring large amounts of data frequently or for audio/video programs	PCs
Gigabit Ethernet	Can attach a device to a system's network adapter, router, switch, or hub port	1,000 Mb/s maximum sustained transfer rate—ten time faster than Fast Ethernet	Remote file access and sharing large amounts of data and/or large audio/video files across a network	PCs
Thunderbolt	Supports daisy chaining of multiple devices through a single connector so you can multitask at Thunderbolt technology speed without having to use a switch or hub	Two bidirectional channels (per port), with theoretically up to 10 Gb/s of bandwidth	Fast transfer of large amounts of data. Multiple-stream digital video and high-resolution digital audio and video applications	Macintosh® computers

* Hot-swappable means you can attach a device without shutting down/restarting the computer.

Note: For convenience and flexibility, you may want to choose a WD hard drive with multiple interfaces. Many WD external hard drive models are available with a combination of USB, FireWire, and/or eSATA interfaces.

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